TMF

THE MAC FLYER - For Greater Safety in MAC Air Operations

November 1987

In a Hurry to Die . . . page 21

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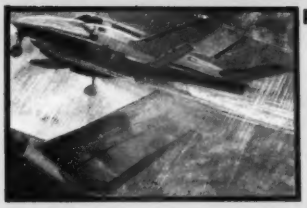

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Everybody Is Doing It, Why Not You?

What are they doing, you ask? Why, entering the 1988 MAC Flight Safety Writing Contest, of course. Remember in your youth (easier for some than others) when your mother said: "Just because everyone is doing it, doesn't mean you can do it?" Well, this is one time your mother IS wrong, so take advantage of it. Now you ask, where can I do it? Why, anywhere you want to. In the office, at home, in the airplane, even in the crew bus. Do what, you ask? Read on.

Nearly everyone associated with flight has one or two words of wisdom about staying alive. Share yours with the world—literally. Your winning entry will be read by tens of thousands of readers from all over the world. From the halls of Montezuma to the shores of Australia; from South Africa to the Indian Ocean—your thoughts may make the difference between retirement pay and survivor's benefits for somebody, somewhere, some time.

Your entry doesn't need to be flawless; just do your best. Content is what counts, and our staff of editors will correct spelling (with the help of a dictionary of course) and put commas where they belong. Anything with a flight safety message is acceptable, be it fiction or non-fiction, poetry, etc., the choice is yours.

So go ahead and do it! See rules below. ✯

THE RULES

The 1988 MAC Flight Safety Writing Contest is conducted according to MACR 900-3 and these rules. All entries must be original, unpublished, and postmarked no later than 31 March 1988. Stories must be between 1,000 and 3,000 words long (about 6 to 14 double-spaced typed pages). Poetry should be about 75 to 100 lines. Entries must contain an *aviation safety/mishap prevention message*. Manuscripts must be double-spaced, typed and submitted in two copies. Identify entries by title only and attach a cover sheet showing the author's name, address, duty phone number and unit. The cover sheet must contain a brief autobiography.

The contest is open to anyone. Entries qualifying under the above rules earn their author a free one-year subscription to *TMF*. However, contest prizes (desk sets and plaques) may only be awarded to military members and civilian employees of the Department of the Air Force or Air Reserve Forces. Other entrants may be selected for Honorable Mention in a special category. All winning stories will be published in *TMF*. Entries should be addressed to:

Flight Safety Writing Contest
HQ MAC/IGFE
Scott AFB, IL 62225-5101

The Chain

The pilot in command must remain in command.

By Capt. Lionel D. Alford, Jr.
Det 1, 1401 MAS

Lt. Bob Landrey sighed. Being a new C-21 IP was difficult enough without having to train lieutenant colonels. Lt. Col. Daniels was a good enough pilot, although he hadn't flown for six years and was having a bit of trouble getting the hang of the C-21. This was his first flight with an IP, but instead of learning copilot duties, the colonel had insisted on flying "at least the first couple legs," because he still felt a little uncomfortable in the plane.

The mission was further complicated by the fact their six DVs had shown an hour early, and the plane had to be positioned in front of base operations. That cut Bob's mission planning time to half an hour. This wasn't a mission to stint on planning either. The entire northeast coast of the United States was either socked in or going to be. Andrews, their first stop, was 400 and 4 intermittent to 3 miles vis., and the nearest alternate was Wright-Patterson AFB, almost an hour's flight away. Visibilities further west of Andrews were going below minimums and Bob was relieved Andrews' forecast was as high as 400 and 3 miles.

Colonel Daniels took the left seat; they loaded the DVs, completed the preflight checks, and took off. Climbout was uneventful and everything seemed to be going fine. Bob was busy enroute to Andrews giving Colonel Daniels more OJT. Consequently, he forgot to update Andrews weather. No sweat, thought Bob, we'll soon be within range of their ATIS and besides, the weather, "couldn't get that *bad* that *quickly*." The colonel seemed to be having less difficulty than before, and Bob was feeling good about the way things had gone overall. He had done some pretty slick work getting the mission planned as quickly as required and taking off an hour early to boot.

Bob got the ATIS for Andrews about 100 miles out, "300 partially obscured visibility one eight . . ." That's not bad, thought Bob, but I've never heard of 18 mile vis at Andrews. He called the SAM Command Post to relay the arrival brief. After that, things got a little rushed in the cockpit as Bob checked Colonel Daniel's descent. Bob even set it up in the UNS. Can't screw it up when the descent rate is given right to you, thought Bob. But the colonel was having problems. Problems compounded, because right after leaving FL 310 they were in the soup. Approaching Armel VORTAC, about 35 miles from Andrews, Bob thought about the ATIS again; that weather is impossible for Andrews, he thought. He listened again. "300 partially obscured, visibility one eight . . ." No, he was right, 18 miles and no RVR given in the ATIS briefing. Something fishy about this.

"Colonel, you have the primary. I'm going to talk to METRO. Andrews METRO, MAC 40010."

"MAC 40010, Andrews METRO."

"Andrews METRO, what is your current weather?"

Pause.

HONORABLE MENTION
1987 MAC FLIGHT SAFETY WRITING CONTEST

"Weather at Andrews is 300 partially obscured, one eighth mile visibility, RVR 18 with fog."

"Colonel," said Bob, "Andrews is below minimums." Then he made a frequency change and a radio call the colonel had missed.

"Andrews METRO, what's the weather at Dulles?"

Pause.

"Weather at Dulles is currently 200 obscured one half mile with fog."

Bob didn't want to take this green pilot down to bare minimums if he had any other choice. He was correcting him, already, on every other radio call. Colonel Daniels had blanked out everything but flying the plane. Bob stole a look at the low chart. They were just being turned south for an extended downwind into the pattern at Andrews. Because of the botched descent, they had fuel for one long approach and just enough to legally get to Wright-Patterson. On the low chart, Washington National was the closest field to their present position.

"Andrews METRO, MAC 40010, what is the weather at Washington National?"

Pause.

"MAC 40010, Washington National is 300 overcast one mile visibility."

Bob called the Washington approach controller. "Washington Approach, MAC 40010. I can't land at Andrews. I want to divert to Washington National Airport."

"MAC 40010, turn to heading 050 and intercept the Localizer Runway 36 for Washington National Airport."

The colonel turned the plane around as Bob changed navaid frequencies, set up the instruments, and briefed the approach. Passing the final approach fix, they were handed over to tower. "Washington tower, MAC 40010, past the final approach fix, gear down for the full stop."

'MAC 40010, Washington tower, discontinue your approach for traffic."

"Sir, go around!"

"What, Bob?"

"Colonel, go around. The tower discontinued our approach."

"MAC 40010, turn left to a heading of 180-degrees, climb to 3,000 and contact Washington Approach."

They turned the C-21 around and cleaned up. Washington Approach sent them back down to 2,000 feet. The colonel immediately accelerated the plane to 240 knots, but Bob pulled back on the thrust levers and told him to maintain 200 or less. The fuel was still good, but if they couldn't make it on this approach they would have to divert to Wright-Pat. Now that I've got time, thought Bob, I better give SAM a call and tell them where we're going.

"SAM, MAC 40010. We're landing at Washington National. Send out some transportation for our VIPs."

"MAC 40010, SAM, Roger. You're landing at Washington National?"

"SAM, affirmative!"

"MAC 40010, Washington Approach. Turn left to heading 030 degrees and intercept the localizer, cleared ILS approach Runway 36."

"Colonel, that's inside the final approach fix. They turned us inside the final approach fix."

Colonel Daniels just sat there as the localizer course and glideslope started to swing. The plane was inside the final approach fix, unconfigured, last chance for an approach, and at 210 knots!

"Sir, I have the aircraft!" Bob took the controls, threw out the spoilers, then the gear, and intercepted the course and glideslope.

"Sir, you have the aircraft. Before landing check."

"MAC 40010, SAM."

"Sir, listen up on the primary, SAM is calling us. SAM, MAC 40010."

"MAC 40010, you can't land at Washington National."

WHAT? On final approach, in the soup, and they tell me I can't land here, he thought. "SAM, I'm on final approach."

"Flaps eight, Sir."

I don't have time to figure this out.

"Flaps 20."

"MAC 40010 is landing at National."

"Flaps full, Colonel, Sir, you are under the glideslope one dot, pull up! Level off! Breaking out of the weather. There's the runway. Sir, are you having trouble with the aircraft? Pull up! I've got the aircraft." Bob took control of the

aircraft. "Hell, the spoilers are still out! Spoilers retracting. There we go. Steady. Safety check, gear, flaps full, and hydraulic pressure checks. Power coming back, and we're on the ground."

Bob landed the aircraft.

****

Time pressure and cockpit overload caught Bob in a situation where he had to make many critical decisions in a short time. The outcome of these events was fortunately a safe landing, but had Bob been less vigilant or the circumstances more complicated, the results could have been tragic. Though this story describes a very specific event, the moral pertains to all flying. Whenever you strap on a plane, you begin a chain of events with a desired result of safe and normal mission completion. This isn't always the case. Inexperienced crewmembers, changing weather conditions, breakdown in cockpit discipline, insufficient flight planning, and aircraft emergencies each forms a weak link in a chain of event which, if not discovered and interrupted at some point, can end in a mishap investigation. Bob broke the chain of events by taking control of the aircraft and landing it. He could have prevented, or at least circumvented, many of the events leading up to that moment.

The first weak link was forged in the flight planning room; Bob could have insisted on taking the full mission planning and briefing time. More extensive briefing might have better prepared the copilot for what happened.

The unexpected formed the next critical link. Bob could have updated the weather with any AF METRO or flight service. He didn't know weather at destination was rapidly deteriorating. His decision to make an approach and to which field could have been made at 200 miles rather than 20. This lack of knowledge kept alive the time compression started in flight planning. Further, had Bob known destination weather was going near minimums, he could have flown the descent himself or insisted the copilot hold to the descent schedule; more gas would have greatly increased the time Bob had to make an approach decision.

Following good technique, Bob got the ATIS early. Unfortunately, the ATIS was not in standard format and the information was incomplete; talking to people, such as METRO or FSS, is better than a recording. Another link is formed.

Once they were in the Washington Approach area, he began to feel the time crunch caused by previous events. The radio call Bob made to METRO brought home the full aspect of the problem, and according to his knowledge, National was the best field for landing. Had Bob given himself more time, he would have seen in the FLIP Inflight Sup that National was closed to military aircraft even as a weather divert. The problem was further complicated by the copilot's inexperience and Bob's willingness to let him continue flying. That's what IPs are for, but Bob allowed the rank of his student to overcome his judgment.

The final straw was the spoilers. Cockpit coordination was at an all time low, Washington Approach was saturated, time pressure and a short approach clearance set the stage for a last act. Bob's first concern should have been aircraft control—meaning he should have been tweaking the controls. Answering the radio call was on the bottom of the priority list; SAM didn't know where the aircraft was and at that point that fact was less important than aircraft control. Bob stopped the chain of events at the last moment. Taking control and landing the aircraft broke the links which had been building since the rushed flight planning at the beginning of the day.

The mission was successful, the plane safely on the ground, but at a restricted field. Bob reduced his options to the point where he was cornered. Had he broken the chain of events, at any point, he could have improved the decisions he made that landed him in less than optimum circumstances.

The bottom line is *the pilot in command must remain in command.* He cannot let events take control of his aircraft. The aircrew must work together using their training and experience to anticipate and intercept events linking a chain that may end in a mishap. You must recognize the symptoms of mishap-causing events and cut the link which may lead to disaster. ✭

Capt. Lionel D. Alford, Jr., a 1980 AFROTC Distinguished Graduate, completed Pilot Training in 1982 and flew OV-10s in Germany and George AFB, California. Capt. Alford is currently a C-21 Instructor Pilot and the Chief, Det 1, Plans, Mobility, and Intel at Offutt AFB, Nebraska.

Beyond Freezing

A look at winter aviation.

By Capt. Donald L. Rosenberry
Associate Editor

We normally associate cumuliform clouds with hazardous weather, and rightly so, but we have a tendency to also tie the relationship to warmer months, and this can be a dangerous oversight. Although operating aircraft when the freezing level is close to the earth's surface has its good points, among them increased engine performance and drier flight suits, every silver lining has its cloud. In this case it's icing, a devastating phenomenon which can render an aircraft incapable of flight in amazingly short time.

Icing is a cumulative hazard to flight, and that makes its insidious appearance a greater danger. The hazards of icing are numerous: reduction in aircraft efficiency; an increase in stall speed; decreased engine performance; flight instrument interruption; radio communication disruption; and performance degradation of control surfaces, brakes, and landing gear. Basically, ice adversely affects our aircraft through two methods—structural icing affects aerodynamic performance, while induction icing attacks the aircraft power plant's thrust producing ability. Structural icing affects MAC aircraft operation most, and is the focus of this article.

STRUCTURAL ICING

It makes sense that if ice builds up on the exterior of an aircraft, it will affect said aircraft's performance. After all, design engineers spend a lot of time developing a design with just the right balance of weight, strength, and performance. Increased weight added by icing wasn't progged in the Dash-1. Likewise, it probably wasn't figured in your weight and balance sheet, either. Another unplanned effect of ice build-up is decreased airfoil lift production. Very carefully calculated to produce the optimum lift for the aircraft mission, an accumulation of ice can reek havoc on an airfoil's lift-producing qualities. In addition, ice build-up on exposed surfaces tends

to aggravate drag, with unfortunate result. Rounding out the "aerodynamic big four," structural icing can impact thrust development for propellor driven aircraft. It affects propellors in the same manner as airfoils; only lift produced by propellors is actually thrust. Concerning ice on props, there's an additional hazard. Ice fragments formed on propellors can be slung off, and these projectiles are a source of FOD or structural damage. Even if ejected fragments don't damage the aircraft directly, they may result in an unbalanced propellor—not a healthy situation.

RIME,CLEAR, FROST, OR MIXED?

Icing comes in three forms, each with their own variety and severity of threat to aviation: clear, rime, and frost. Clear ice normally forms as water droplets accumulate and freeze on surfaces. This is a relatively slow process, which means most air present in the water escapes as the water freezes. This is the reason clear ice is smooth and glassy in appearance. The worst part of clear ice (aside from the aforementioned generic problems), is it is difficult to remove, and that makes it an immediate and continuing problem. Clear ice forms when the temperature is between 0° and -10° Centigrade.

Rime ice formation depends on a prior setup, that is, water droplets must be supercooled (cooled to a free air temperature below the freezing point of water). These supercooled droplets freeze instantly when disturbed, especially on the surface of a passing aircraft. Since they freeze so rapidly, there is no chance for trapped air to escape, which accounts for the rough surface and milky color characteristic of rime ice. Rime ice forms between 0° and -20° Centigrade. Mixed icing, as the name implies, is a combination of the two types. It can occur when the water drops in cumulus clouds are of widely varying size, or when rain is intermixed with snow. Mixed icing forms quickly, and has all the bad characteristics of both rime and clear ice.

Frost forms on earth-based structures, like aircraft sitting on the ramp, when water vapor sublimes to ice and deposits directly to the structure's surface. Even though it may appear that there is only a thin coating of frost, a coat of frost will cause a 5 to 10 percent increase in stall speed. Frost reduces airflow over the affected airfoil with a consequent loss of lift.

The following charts reveal some of the effects icing has on aircraft, and some things we can do in response to this threat.

EFFECTS OF ICING ON AIRCRAFT

Increased stall speed and power required to achieve or sustain flight.

Resulting surface roughness increases drag, decreasing aircraft performance.

Stall angle of attack will decrease, in some aircraft, stall can occur before stall warning systems activate.

Aircraft stall characteristics can change.

Power available may be decreased.

Trim effectiveness may deteriorate.

Engine FOD or bogdown is likely.

Asymmetric shuddering due to ice shedding from propellors is likely.

Helicopters may experience drastically changed autorotation capabilities or none at all.

Control surfaces may freeze in place.

Wing flaps can be damaged in the effort to retract or extend them in icing conditions.

Landing gear mechanism may freeze in place, or be damaged by movement in icing conditions.

Icing can completely block cockpit visibility.

Icing can damage or degrade the effectiveness of communication and navigation equipment.

Icing will exacerbate any other emergency conditions.

Icing can create significant error for any instrument dependent on outside references such as pitot/static tube or engine pressure ratio measurements.

ICING CHECKLIST

Before takeoff, check weather for takeoff, landing, and enroute icing. If icing exists, ask ATC or weather for any PIREPs they've received.

If you can, plan your route around known icing.

Always remove ice or frost from airfoils before attempting takeoff.

If it's below freezing, avoid taxiing through or taking off over water, mud, slush, or loose ice. If you can't avoid it, make an additional preflight check of flight controls and wheel areas.

Climbing through icing conditions, use a higher airspeed than normal, as icing decreases stall speed.

When deicing equipment begins to lose effectiveness, it's time to change the route of flight or altitude immediately.

Rime icing is usually quite extensive in stratoform clouds, horizontally, so a descent to above freezing temperatures, or a climb to temperatures below -10° C not only may reduce ice build-up, but may avoid the ice region altogether.

Avoid cumuliform clouds if at all possible (a recurrent weather caution, regardless the season).

If you're experiencing icing, avoid abrupt maneuvers, your aircraft isn't the same aerodynamic vehicle it was before the ice.

When landing with ice accumulations, fly your approach with extra power.

FILE A PIREP AS SOON AS CONDITIONS PERMIT—ground weather forecasters have no more reliable means of identifying icing areas.

Safety Workhorse—The FSO

By Lt. Col. Michael G. May and
Capt. Donald L. Rosenberry

Use your imagination!

"Meetings, meetings, meetings! That's all we do around here—go to meetings. I'll never get my paperwork done if I don't skip a few meetings today. Now let's see, which ones can I afford to skip? Aha! There's a wing safety meeting at 1400 today; they'll never miss me. Besides, I can always make it up next quarter."

Well, well, what have we here? Are these the thoughts of an average MAC crewmember/program manager frustrated by seemingly unending demands on his/her time? In this chapter we want to discuss FSO techniques for making flight safety meetings more interesting. One can easily introduce persuasive arguments based upon the motherhood and apple pie routine to brow beat everyone into attending safety meetings, but we think there is a better way.

We'll start with AFR 127-2. If you turned to Chapter 13, Flight Safety, you went too far. To start with, let's examine paragraph 9-5a. Air Force deals with safety meetings as a method to disseminate mishap prevention information. Philosophy behind safe-

ty meetings is discussed, then some meeting requirements are laid out. MACR 127-1 (currently under rewrite as MACSUP to AFR 127-2) picks up the ball from Air Force and carves out for MAC units a bit more structure to flight safety meetings. Let me sketch *some* specifics that may or may not apply to your unit (ulterior motive—get FSOs to restudy the books).

a. Monthly.

b. Wing—semiannual (be sure to read the purpose of this one).

c. Analyze attendance (check out use of AFORMS—some are doing this now).

d. Keep a list of mandatory topics (by the way, they're scattered around several locations).

e. Minutes. Publish them but keep privileged data out and yet make them informative (don't be negative about this, it's possible; more on this later).

And now, let's talk technique. Take "a" above. Monthly. MAC requires monthly meetings at a minimum. If something comes along the wing commander/squadron commander thinks should be disseminated to aircrews, do what you must, hold an ad hoc safety meeting or call it a briefing as mentioned in AFR 127-2, paragraph 9-5b. There are times when events in MAC generate a spontaneous safety meeting, maybe in the base theater, with opening remarks from the wing commander. This type of environment enhances flight safety consciousness in the minds of all associated with flight safety. Class A mishaps may be used to communicate lessons learned and thereby prevent a similar tragedy in your own unit. Are you receiving Class A and B mishap mini-briefs? The MAC flight safety staff sends them to all MAC flying wings and NAFs. Make good use of them. Tailor them to your aircraft, your mission, and your people. Everyone can learn valuable lessons from a Cessna 172 or F-4 mishap. Certainly a C-5 unit can gain a great deal from a thorough study and discussion of a MAC C-130 LAPES Class A mishap. *FSO, use your imagination.* Ask yourself what the mishap crew's real problem was. We believe you'll find it wasn't weapon system peculiar. One more thing on this point. Each wing consists of a number of squadrons, and several include associate reserve squadrons. Use all available meetings to provide an opportunity for aircrews to attend a flight safety meeting in person. Personal attendance at and participation in flight safety meetings are essential; and listening to a sister squadron's safety message is far better than relying on printed minutes. Safety is safety regardless of which unit relays the message. Encourage this in your unit by making sure all unit personnel are aware of other units' flight safety meetings.

No one in the wing can have a greater impact on safety than the wing commander who personally delivers his policy on flight safety. That's the purpose of the semiannual wing safety meeting. The wing commander's part in the meeting doesn't require a 20-minute dissertation. It's not so much what he says, as how he says it and what he does daily to reinforce what he said that's of major importance. FSOs can be of great assistance to their commanders by pointing out policy questions that need to be stated and bringing to the commander's attention safety issues flyers are concerned about. Make good use of this time.

Don't take attendance unless you intend to use it. Since the regulation requires you to take attendance, figure out a way to make these lists of names work for you. We have some suggestions. First, keep an attendance log for each aircrew member covering a 12-month period. This is best done at the squadron level. Review each member's attendance. If a person hasn't attended at least one meeting per quarter, he/she missed too many. Also, if someone misses meetings for four months, there is a problem. Maybe your safety meetings are dull and uninformative. Maybe you need to take a look at when you are scheduling meetings—you may be consistently making it impossible for some to attend. Or, far be it for us to point fingers, but maybe you have a spot attitude problem and an attitude adjustment needs to be encouraged. You can make good use of attendance tracking.

Make a list of mandatory briefing items. Try assigning one item every month. This will help to remember them and provide a nice structure for your safety briefing program. Take a look at MACR 127-1, paragraph 3-4o, NOTE. That will start your list of required items. Another is found in AFR 127-4 and reiterated in AFR 127-2, paragraph 9-2b. You may have other local issues you want to list. Keep in mind, safety program management is designed to strengthen safety consciousness within a unit. If the program requires some counterproductive activity, make that fact known and try to eliminate the requirement. Your MAC staff is here to help you.

Before we talk about promulgating the important issues brought up in your flight safety meetings, let's talk big-time technique.

"THAT'S ENTERTAINMENT . . ." the song goes. Now don't think we're going to talk about "Ed Sullivanizing" MAC flight safety meetings. Not so! However, there are ways of getting the safety message across that are also entertaining. You, yes you, the FSO who thinks he has no imagination or talent at all, can develop a safety meeting that is somewhat,

if not very, entertaining. It just takes gut . . . uh, intestinal fortitude . . . courage, and some self-confidence. Here are some examples of attention-getting steps that have worked in the past.

—The wing safety chorus singing "Safety too, can go with you, in air, on land, or in the band ..." all done to the tune of *Tea for Two* (an old tune, ask your wing commander). Antics and costumes of course add to the fun. Remember, the purpose is gaining attention, leaving a message, and having fun in the process.

—The wing safety band playing anything (be creative and include your safety message). Have the safety office members bring their trumpet, trombone, and/or large garbage can lids as symbols; you'll also need a drummer. Keep in mind, though, we're not talking about the Boston Pops. Think about this one, it can be a lot of fun.

—A particular wing is having problems with bird strikes, big time! The wing chief of safety attempts to open the quarterly wing flight safety meeting on a standard official sober note but in the back of the theater, there arises a ruckus. A very large bird is making a disturbing cacophonous entrance and the chief of safety becomes visibly upset. As the bird proceeds down the theater aisle, it appears to peck the head of a couple of bald crewmembers. Finally the screeching bird reaches the stage and presents the chief of safety with a note. The chief reads it aloud: "I represent the Fledgling Federation of Feathered Friends in a frantic plea to your evil metal beasts of the air that have been terribly injuring our fine feathered flock without cause. We deamed you cease your . . ." At this point, the chief becomes unglued, as it were, with "Get this thing out of here, where's the airfield manager and the bird control team?" Two shots are heard and the airfield manager with accompanying aggressive lynch mob rush on stage with bodily harmful implements and chase the bird—the bird exits stage on the left with the lynch mob in close pursuit. The meeting continues.

—One more for the road. The time draws near for the quarterly flight safety meeting. The stage curtains are closed and lights are on. As the time arrives, the lights go out. The stage curtains open and an eery blue-green hue emanates across the stage. There is a box, looks like a coffin, in the middle of the stage and then a suspicious fog rolls out from all sides. Nothing is heard for a time until the coffin begins to open with the disturbing screech of rusty hinges. A hairy arm and hand with exceedingly long fingernails is opening the lid and out comes . . .

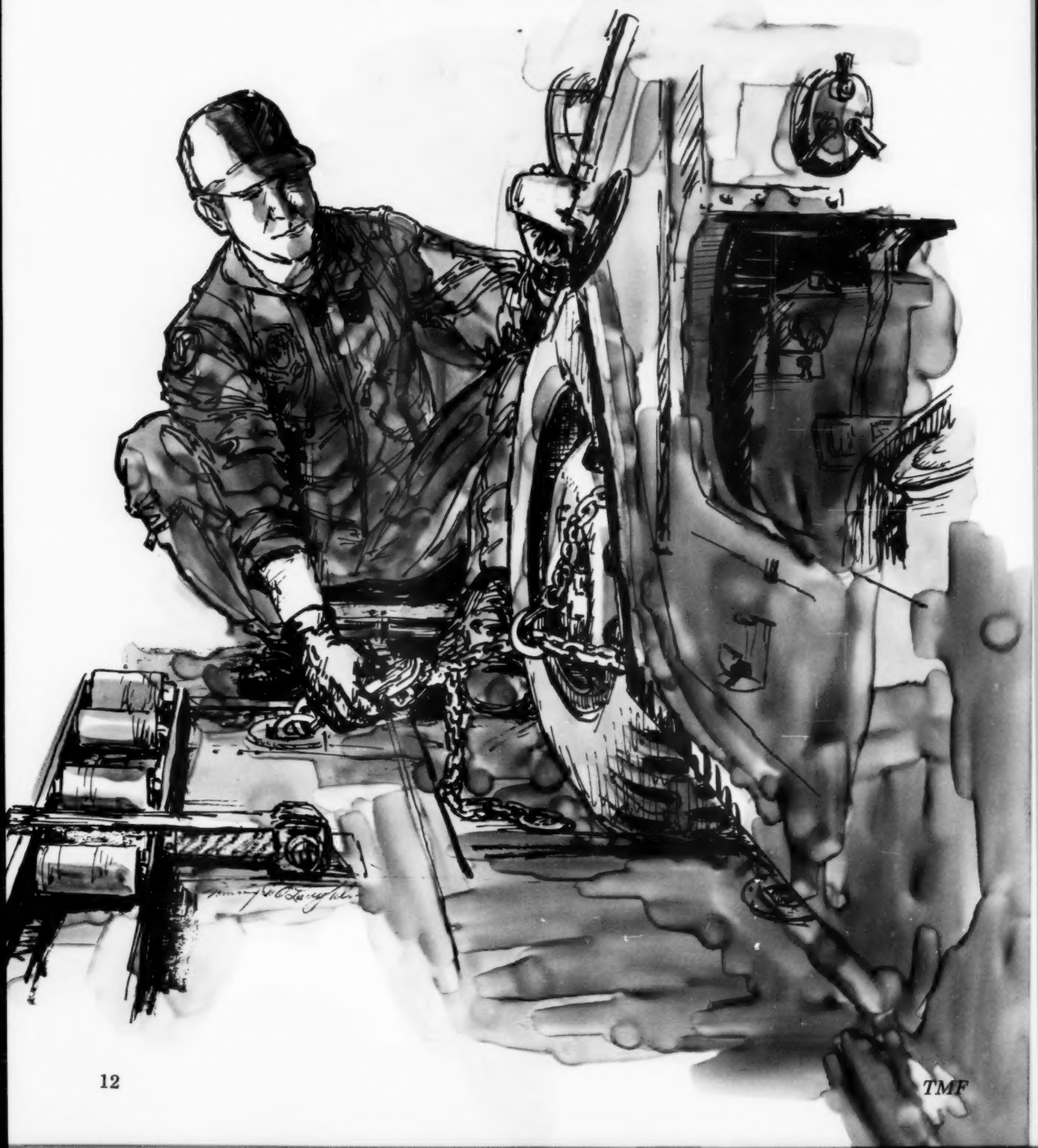
We're going to let you finish this one. These are just some ideas to help you create a meeting with a safety message people will want to hear.

Let this be your goal. Tailor your mishap prevention (safety) program to be entertaining and effective. This will help folks avoid mishaps. We would call this process a challenge in marketing. We safety people are in the marketing business. Therefore, we need to package our product attractively and make it readily accessible. Also, we are not in the business of saying NO. To quote one of our distinguished leaders, the MAC IG, "NO" is commander vocabulary while the safety staff is advisory. We need to be in the business of pointing out risk and offering the safest way we know to get the job done. With these concepts built into our safety programs we may find safety meetings provide "standing room only" on occasion and the safety message well implemented by all.

Hopefully, we've sparked some imagination with these examples of real life ingenuity at work. Now let's pass on a few words about your safety meeting minutes. We've presented you with a bit of a conflict. On one hand you must include sufficient detail to ensure those that missed your entertaining and informative meeting will gain the needed information by reading the minutes; on the other hand, you must delete sensitive, privileged information. Many of you may think these two tasks don't mesh, however, you don't have to designate tail number, date of mishap, location, or any other data identifying a specific mishap in order to relate that a crew of six died because they failed to communicate, or maintain situational awareness, or follow their checklist. Emphasize the lessons learned. Do a paragraph on where in your mission these lessons learned might play a significant role and why it's important for aircrews in your unit to capitalize upon someone's mistakes and learn from them. Protecting the privileged status of Air Force flight safety mishap reports is one of your high priority duties and keeping this information out of meeting minutes is essential. At all costs, avoid writing minutes that talk about what was talked about, i.e., "Captain Wright briefed a recent mishap." Instead, tell them what he said in a sanitized version.

Ideas on how to make safety meetings effective are as numerous as the number of FSOs in MAC. We don't believe we are the keepers of all available good ideas, but we do know how important it is for you fine flight safety officers to work hard in the directions presented here. We'll talk your ear off if you give us a call. Also, the folks upstairs (MAC/IGI) carry around a wealth of knowledge gained from looking at all your programs and they are more than willing to talk. Safe flying!

NUMBERS



TMF

I had to get that chain off, NOW!

By SMSgt. Norman H. Wood
HQ MAC/IGI, Scott AFB, Illinois

From the Director: This is an excellent example of type of article we hope to publish in future *TMFs*. Nothing registers better than reading about one's first-hand experience. We want to publish your story—loadmasters, engineers, gunners, etc.

Call us (AV 576-3534) for further information.

Everyone knows you can make numbers or statistics tell any story you want. For years people manipulated numbers to suit their own purpose, and with the advent of computers, it's really easy to do.

Safety folks are very good at compiling numbers, distributing reports, and briefing everyone on things gone wrong. But sometimes numbers aren't *things*, they're *people*. For example, a loadmaster killed when struck by an improperly rigged item in the aircraft; a crewmember who lost a finger when his wedding ring caught on a litter stanchion as he tried to maintain his balance during in-flight turbulence. No one can predict a part of the aircraft is going to hit you, or your wedding ring is going to catch on a litter stanchion. But the numbers show it happens. People may become numbers because they don't do their job properly. As a C-130E loadmaster, I remember when I almost became one of those numbers.

I was participating in an eight-aircraft deployment from our stateside base to Germany in support of REFORGER. We were nearing the end of the exercise, and redeployment of Army forces dictated shuttles between two locations. My crew was on the last shuttle of our third consecutive 16-hour crew day. You know how that feels. We've all done it at some time or another. Sixteen-hour days are bad enough, but shuttles only intensify the misery. Needless to say, we were tired.

My last load bound for the offload station was an M-113 Armored Personnel Carrier (APC) and four troops. The plan was to offload troops and cargo using Engine Running Offload (ERO) procedures to minimize ground time so we could get back for some much needed rest.

After clearing the runway, and while taxiing to the offload area, I got the APC driver in the seat and started taking off restraint chains. I had to leave at least one chain attached for restraint in each direction until we came to a complete stop. The chain I selected for aft restraint was positioned next to the right side of the aircraft—I had been tripping over chains all day long and I was tired of it.

We arrived at the offload area and I opened the aft cargo door and ramp. While I coordinated with the offload team chief, a qualified C-130 loadmaster, the rest of his team scurried on the aircraft to remove all restraint. I started making my way back from the ramp area, toward the front of the aircraft using the left dual rail cover as a walkway, when one of the offload team members in front yelled that all aft restraint was removed.

I signaled to the team chief, standing outside the aircraft, to start directing the APC off the aircraft. As I reached the forward end of the vehicle, I saw one chain on the right side still attached to the load. I must have pumped a thousand gallons of adrenalin in the time it took me to get from one side of the aircraft to the other. The APC's engine was running, and I knew I had to get that chain off *NOW!!!*

Yelling for the driver not to move, I reached for the tiedown and rotated the collar holding the jaws of the D-1 device closed (Yes, I know, I'm dating myself). The jaws opened and the chain went slack just as the APC lurched toward the back of the aircraft.

The APC moved about two feet before it could be stopped. When it stopped, I removed the chain from its vehicle attachment point then double-checked the entire vehicle for anything else wrong. Finding nothing, we continued the offload.

During taxi to the runway, I thought of what could have happened a few short minutes ago and started to shake. Had I not loosened the device in time, either the APC would have started pulling the aircraft floor up, or it would have propelled the 2x12 shoring into the bulkhead as the tracks spun, and maybe the chain would have broken, possibly into hundreds of projectiles.

I was almost a number. There were a lot of contributing factors— noise, exhaust fumes, and fatigue. The truth is, I didn't do my job properly, and I almost provided new briefing numbers.

It would be another ten years before I would scare myself that much again. Older, but apparently not as wise as I thought, I didn't do my job right, again.

. . . numbers aren't things, they're people . . .

I was scheduled to launch on the last aircraft for our Operational Readiness Exercise (ORE). During crew briefing, the pilot stressed the importance of an on-time launch to make closure at the operating base.

The flight engineer and I proceeded to the aircraft for pre-flight. We had plenty of time, the better part of two hours. I had been told my load would be one MD-3 power cart, two 463L pallets, and 34 passengers. A piece of cake.

I finished my pre-flight and prepared the aircraft for winch operations, planning to load the two pallets last. I then insured there were enough seats for the passengers.

I was just completing the header information on my weight and balance Form F when the engineer said the aircraft had a fuel leak and we were moving to the spare. Just marvelous! Now that most of my work was done, I had to do it all over again. What time was it? One+15 prior to takeoff. We're starting to cut it close.

I hustled through pre-flight and when I opened the ramp and door, there was the load, ready and waiting. As I inspected the load, my heart sank. One 463L pallet weighed almost 8,000 pounds. The only way I could load the aircraft was put the 8,000-pound pallet in first, winch the MD-3 in, and put the last pallet on the ramp. I was going to have to play musical chairs with the intermediate rollers and route the winch cable under the heavy pallet after it was loaded. The time factor was getting to be very important.

The rest of the crew had shown by then and everyone pitched in. As the 8,000-pound pallet was positioned in the aircraft, someone called out that the locks were engaged. I started to work on the rest of the load immediately. When everything was finally loaded, I seated and briefed the passengers and began to work on the Form F. Someone called down from the flight deck, several times, asking when I would be done. I remember thinking I would be done much sooner, if only they would stop asking me. I already knew how important the scheduled launch was. I finally finished the Form F, and as I handed it to the pilot for his signature, I mentioned the aircraft was extremely tail heavy for our weight. Unfortunately, there was no other way to load the aircraft and stay within flight limits.

I exited the crew entrance door to stand guard for engine start and glanced at my watch. Five minutes to scheduled takeoff. Thank goodness for the 14-minute pad, but we were still going to have to really hustle to start engines, taxi, perform an engine run-up, and take off in 19 minutes.

While waiting for engine start, I mentally went over all the things I should have done. Everything was okay until I got to securing the load. I couldn't remember actually checking the locks on that heavy pallet. I knew someone had yelled the locks were engaged, but I couldn't remember physically checking them. I resolved to do that when I got on board.

Engines were started without incident, and I closed the crew entrance door behind me. I checked hydraulic fluid quantities on my way back to scan the engine and wings during taxi and run-up. When I got to the heavy pallet and checked the locks, the right hand locks were in, but the left hand ones were not engaged. Since the left hand locks provide the majority of restraint, I had an immediate problem.

During taxi, I worked furiously to get the locks engaged. They popped in just prior to engine run-up. Run-up was uneventful, and we departed with two minutes to spare.

It was only after we were airborne that I realized what could have happened had the pallet broken loose during takeoff roll. As tail heavy as we were, the pilots would have never been able to control the aircraft. Had they tried to stop it on the runway, I don't know where that 8,000-pound pallet would have gone—probably into the 34 passengers.

Again, I had gotten lucky. Just think of all the numbers that mishap would have generated.

I figure everyone is entitled to a little luck once. I've been lucky twice in my career. I hope I haven't used some other crewmember's luck. If so, there is someone out there flying the line right now who is going to get hammered—maybe fatally—the first time he/she is not doing the job properly. That someone is going to wind up being one or more numbers briefed to the rest of us.

Don't be that number!

SMSgt. Wood has flown C-130s for over 20 years, with a little C-123 and C-7A time thrown in for good measure. Sergeant Wood's assignments include tours in Vietnam and Europe, as well as rotations to South America and the Artic. A previous instructor and flight examiner loadmaster, Sergeant Wood is presently assigned to the HQ MAC IG Team, Scott AFB, Illinois.

Flying-Hour Milestones

10,000

Lt. Col. Patrick J. O'Donnell, 86 MAS
MSgt. Melvin P. Montgomery, 707 MAS

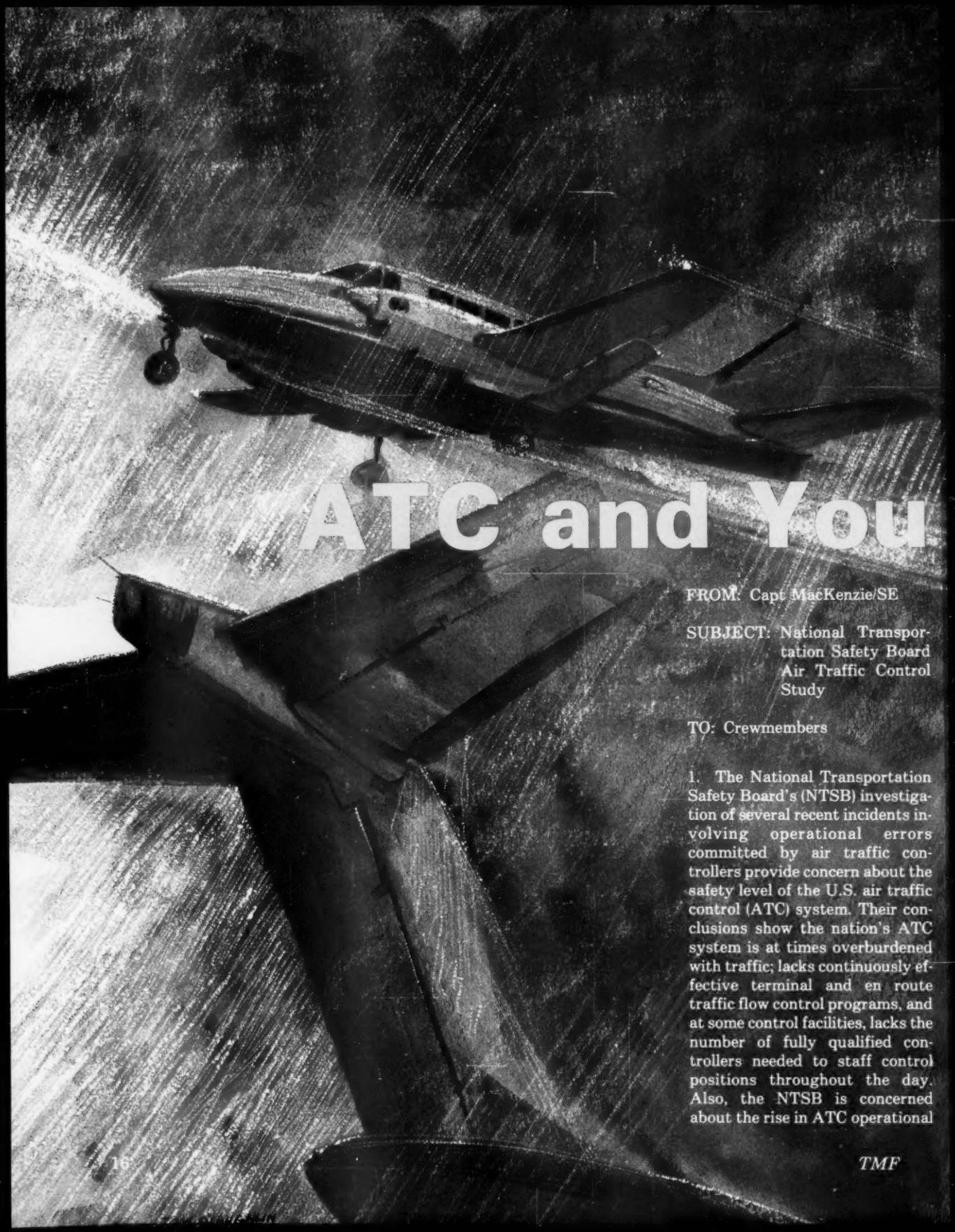
5,000

Col. John D. Szostak, Jr., 60 MAW
Lt. Col. William L. Calhoun, 8 MAS/CC
Lt. Col. Gordon W. Dobson, 702 MAS
Lt. Col. David S. Hake, 9 MAS
Lt. Col. Gene F. Lambert, 305 ARRS/CC
Lt. Col. Herbert W. Nakagawa, 21 TAS
Lt. Col. Laurens M. Pitts, 707 MAS
Lt. Col. James V. Vanden Bossche, 305 ARRS (Posthumous)
Lt. Col. Frank W. Waid, 305 ARRS
Maj. Oral W. Carper, 305 ARRS
Maj. Thomas R. Love, 305 ARRS
Maj. Stewart B. Mein, III., 702 MAS
Maj. Stewart T. Peet, Jr., 305 ARRS
Maj. Gerald N. Saur, Jr., 305 ARRS
Maj. Frederick D. Schultz, 305 ARRS
Maj. Stephen D. Smith, 707 MAS
Maj. Scott S. Withers, 702 MAS
SMSgt. Allen W. Grothe, 86 MAS
SMSgt. Robert J. Maciejewski, 305 ARRS
MSgt. Douglas H. Stroz, 702 MAS
MSgt. Raymond T. Willetts, 9 MAS
TSgt. Thomas M. Blocker, 86 MAS
TSgt. Stephen J. Shappee, 9 MAS

2,500

Maj. Robert D. Blough, Jr., 305 ARRS
Maj. Larry L. Lybarger, 305 ARRS
Maj. Theodore J. Rabaja, 305 ARRS
Maj. John H. Schramm, 305 ARRS
Capt. William J. Flanagan, 305 ARRS

Ranks and units are those at time of award. See MACR 900-3 for details on how to apply for your own milestone award. ★



ATC and You

FROM: Capt MacKenzie/SE

SUBJECT: National Transportation Safety Board Air Traffic Control Study

TO: Crewmembers

1. The National Transportation Safety Board's (NTSB) investigation of several recent incidents involving operational errors committed by air traffic controllers provide concern about the safety level of the U.S. air traffic control (ATC) system. Their conclusions show the nation's ATC system is at times overburdened with traffic; lacks continuously effective terminal and en route traffic flow control programs, and at some control facilities, lacks the number of fully qualified controllers needed to staff control positions throughout the day. Also, the NTSB is concerned about the rise in ATC operational

errors—one indicator of system safety—in the past few months (the study is dated 13 May 1987) reversing the preceding year's generally decreasing trend. The number of runway incursions, another safety indicator, has also risen the last 2 years. Finally, the number of near-midair collision reports, particularly the number involving at least one air carrier airplane, increased between 1985 and 1986.

2. The NTSB believes the frequency of operational errors leading to compromises of separation standards for aircraft in flight or on the runway is one effective indicator of ATC system safety. The total number of operational errors increased 18 percent during the first quarter of 1987 over the first quarter of 1986. This recent increase contrasts sharply with a general reduction in operational errors during 1985 and 1986. Runway incursion incidents caused by controller performance deficiencies have increased nearly 50 percent, from 77 in 1984 to 115 in 1986. Near-midair collision reports have also increased during the past year. The total number of near-midair collision reports may not be a direct indication of ATC system performance since they often involve visual flight rules (VFR) traffic. However, the NTSB finds it most significant that 57 of the encounters in 1986 involved critical hazards for air carrier aircraft, most of which were presumably operating with protection afforded by the ATC system. This represented a 42 percent increase over 1986 occurrences. (A critical hazard is a situation where collision avoidance was due to chance rather than an act on the part of the pilot.)

3. Historically, the number of operational errors and near-midair collisions increases substantially during mid-year good flying months. These increases are normally due to increased traffic levels during summer. However, in 1987 the expected upturn started at a level already well above the comparable 1986 period. The NTSB dispatched teams of investigators to examine circumstances of several recent operational errors. The teams consisted of an operational investigator-in-charge, two air traffic control specialists, and a human performance investigator. Among others, they investigated the following incidents:

- On 25 February 1987, a runway incursion mishap occurred at Los Angeles International Airport. The mishap involved a collision between Continental Airlines Flight 866, a B-727, and N98834, a Cessna 310R. Flight 866 was cleared to take off on Runway 25R by the tower's south controller while the Cessna was cleared to taxi across Runway 25R by the south ground controller. The aircraft collided at the intersection of Runway 25R and taxiway 47J. The right main landing gear of the B-727, which had just lifted off, struck the vertical stabilizer of the Cessna 310R causing substantial damage to the Cessna.

- On 31 March 1987, an operational error occurred in Cleveland Air Route Traffic Control Center (ARTCC) airspace near the DRYER navigational fix. The error involved Northwest Flight 427, a DC-9, en route from Allentown, Pennsylvania, to Detroit, and N52DC, a Falcon DA50 en route from Saginaw, Michigan, to Washington, D.C. Flight 427 was given a heading of 360 degrees and a descent from flight level 290 to 240. The Falcon was at flight level 290 and was turned to a heading of 170 degrees, then turned further to 210 degrees and cleared to climb to flight level 310. The two airplanes passed each other with 1½ miles horizontal and 800 ft vertical separation.

- On 3 April 1987, an operational error incident occurred in the Bridgeport, Connecticut, sector of Boston's ARTCC. The error involved Pan American Flight 528, a B-727, en route from LaGuardia, New York, to Boston, and Continental Flight 602, a DC-9 en route from Dulles to Bradley Airport, Windsor Locks, Connecticut. The radar controller issued Flight 528 a climb clearance to 14,000 ft and provided a traffic advisory concerning Flight 602. Pan American Flight 528 advised he had traffic in sight. The radar controller thought he had issued a descent clearance to 15,000 ft to Flight 602 and vertical separation would exist when the aircraft flightpaths crossed. Actually, he had issued a descent clearance to 14,000 ft to Flight 602, which had been acknowledged. The flightcrew of Flight 528 adjusted their climb rate to avoid a potential midair. The aircraft passed with 400 ft vertical separation and 0.69 mile lateral separation.

- On 9 April 1987, an operational error led to a runway incursion incident at Logan International Airport, Boston, during night VFR weather conditions. The error involved Northwest Flight 35, a DC-9, taxiing for takeoff on Runway 9, and Precision Airlines Flight 509, a BE-99 which had been cleared for a visual approach landing on Runway 4L. There was training in progress on both local and ground control positions. The local controller approved Flight 35's request to cross on Runway 4L and while it was exiting the runway, Flight 509 reportedly overflew the DC-9's vertical tail. The tower supervisor became concerned as he observed the incident developing. Although

he vocalized his concern, the error still occurred.

- On 13 April 1987, an operational error incident occurred in the Hampton sector of Boston ARTCC. The error involved USAir Flight 64, a B-737 en route from Philadelphia to Boston, and Eastern Air Lines Flight 695, a B-727 en route from Boston to Washington National. The aircraft were on opposite direction flying parallel courses, with Flight 695 level at FL280 and Flight 64 level at FL270. The radar controller issued a climb clearance to Flight 64 to FL290 as the aircraft were passing. The aircraft did not have standard separation when the conflict alert activated. The aircraft passed with 400 ft vertical and 2.88 miles lateral separation.

- On 16 April 1987, an operational error incident occurred at the Manchester Terminal Radar Approach Control (TRACON) position, part of Boston ARTCC. The error involved Bar Harbor Airlines Flight 756, a BE-99 en route from Boston to Burlington, Vermont, at 8,000 ft and N456DA, a PA-31 en route from Bangor, Maine, to Teterboro, NJ, at 8,000 feet. Both aircraft were on IFR flightplans, and the aircraft passed with 0 lateral and approximately 200 ft vertical separation as the BE-99 nosed over to avoid an imminent midair collision. The radar controller was aware of the pending conflict, yet was busy issuing coordination instructions and holding aircraft in his airspace as a result of adjacent center sector saturation. The controller did issue a descent clearance to Flight 756 when the aircraft were approximately 1 mile apart. Both aircraft filed a near-midair collision report.

4. The NTSB's investigations of operational errors (and runway incursions) disclosed factors and circumstances of errors vary and can't be attributed to one single cause. Most occurrences, particularly those involving tower personnel, resulted from a breakdown in controller procedures, poor coordination, and a general lack of supervision. The NTSB's findings generally show operational errors are committed by both experienced and inexperienced controllers and are just as apt to occur during periods when traffic is light

to moderate as when traffic is heavy. Nonetheless, the NTSB believes a continual daily workload increase can be a factor which increases a controller's vulnerability for error, that fewer breaks and the cyclic nature of the workload can lead to an insidious loss of attentiveness with serious consequences during a period of reduced traffic.

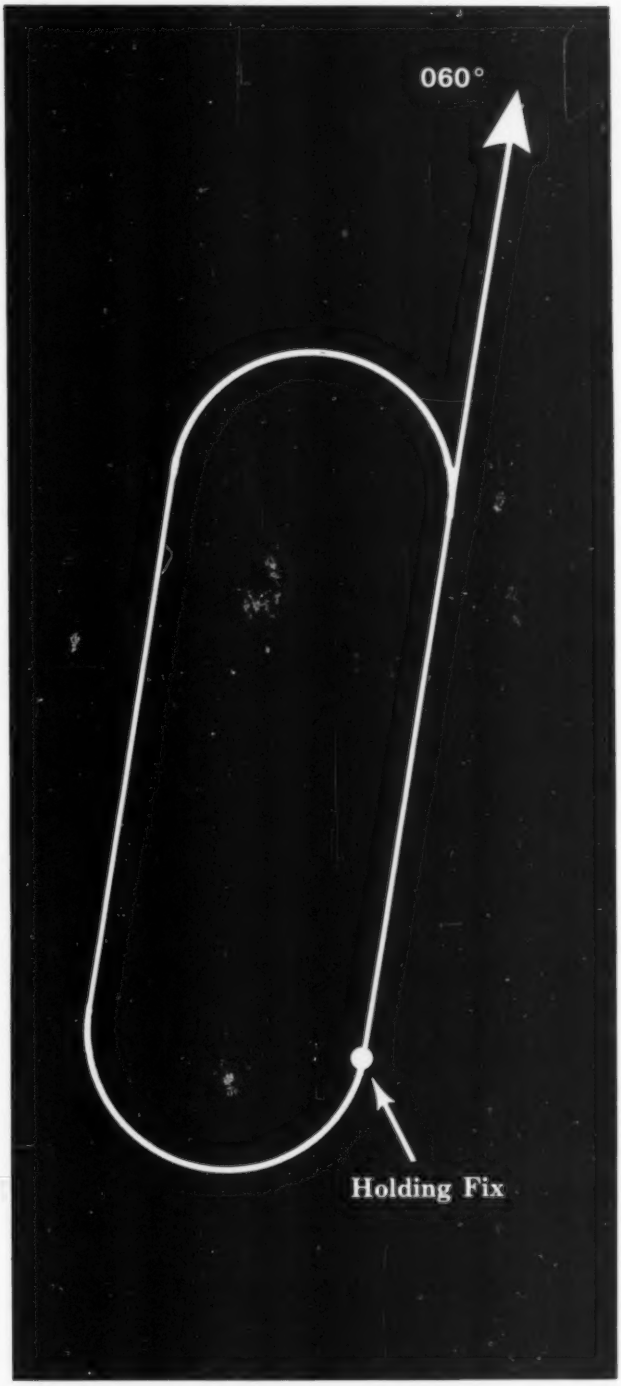
5. Controllers interviewed expressed concern about increasing levels of traffic they were required to control. They stated certain sectors become extremely busy and present complex traffic situations during some periods as air carrier airplanes operate to and from their major hubs for flight connections.

6. What does this have to do with the crewmember? I'm sure every crewmember agrees the function of the ATC system is to promote and assure the safe, orderly, and expeditious flow of aircraft. The system has evolved, with the growth of air traffic, into a complex array of ground-based radar systems, navigational aids, computers, and communication equipment. Although continual advancements in en route and terminal radar facilities, conflict alert logic, and airspace segregation have had significant effects on both safety and system capacity, the primary element in the system remains the air traffic controller. The controller must mentally perceive and project aircraft flow as aircraft enter his assigned airspace, decide the direction and altitude each aircraft must fly in order to pass through the airspace while maintaining prescribed separation from all other aircraft, and communicate proper commands to the pilot. A controller may have more than 20 aircraft to track and direct at a given time. It's a demanding task requiring special aptitude, training, experience, and mental discipline. Sounds like flying, doesn't it? That's the point this "missive" has taken so long getting to. 'Our" job and "their" job are inextricably linked by a common goal—the safe completion of our flight. As crewmembers, *we* must be ready to do our job to the very utmost of our ability. *We* must carefully plan each flight down to the smallest detail so we can clearly communicate our desires to ATC. We can't forget we're half of the ATC safety equation. Air traffic controllers do a great job, and want a safe, efficient system as much as we do. But, they're only human, and they can't do their best if we don't give them ours. We can't do anything about their mistakes, *but we can do something about ours.* ✈

Adapted: *NTSB Incident Brief May 87*

TMF Instrument Quiz

It's that time of year, aviators! Time for rain, snow, sleet, fog, and varying combinations thereof to plague our airborne exploits. These nasty atmospherics frequently cause ATC to say, "Hold it right there," meaning of course you're to proceed to the nearest holding fix without passing GO or collecting $200, and wait out the backlog of other airplanes caught in the same fix. (Fix, holding fix, get it? Oh, never mind). So, your ever-diligent *TMF* staff felt this an appropriate time to review holding procedures with a little quiz. How well you do will be between you and your 51-37.



1. The depicted holding course is:
   a. 060°.
   b. 260°.
   c. 240°.
   d. 040°.

2. This is a _____ holding pattern.
   a. non-standard
   b. standard
   c. standard rate
   d. Standard Oil

3. ATC directed you to hold at 14,000 ft. With no wind, using a standard rate turn, it will take you _____ to complete one circuit in the holding pattern.
   a. 3 minutes
   b. 4 minutes
   c. 5 minutes
   d. 6 minutes

4. If the depicted holding fix was also your clearance limit, you would reduce to your maximum holding airspeed:
   a. upon passing the fix and entering holding.
   b. within 3 minutes of the holding fix.
   c. 5 minutes from the holding fix.
   d. 15 minutes or one quarter of an hour from the fix, whichever is greater.

5. If you're flying a turboprop at the assigned altitude of 14,000 ft, your normal maximum holding speed is:
   a. 250 KTAS.
   b. 210 KCAS.
   c. 175 KIAS.
   d. 175 KCAS.

6. If your holding fix is a VOR station, you should begin turning to the outbound leg when:
   a. the bearing pointer points at the wingtip.

b. the bearing pointer starts to get "nervous."
c. DME indications stop decreasing.
d. the TO/FROM indicator switches from TO to FROM.

7. The assigned pattern has become an ICAO racetrack which has a 3-minute leg. With a teardrop entry you should turn to parallel the outbound course after:
a. the navigator finishes his lunch.
b. 30 seconds.
c. 2 minutes.
d. 1½ minutes.

8. If the depicted fix were an NDB and you approached from the northeast, the outbound leg timing would begins:
a. abeam the fix outbound.
b. upon passing the fix and turning outbound.
c. wings level, outbound.
d. when the copilot says so.

9. The fix is now a VOR again. (You gotta be flexible in this business.) You're inbound to the VOR on the 350° radial with a strong east wind, resulting in a 160° heading. Your entry turn would be:
a. to the left.
b. to the right.
c. not required.
d. either left or right.
e. turn around and go home, you can't get there from here.

10. En route to the fix, you encounter some moderate turbulence. Your Dash-1 turbulence penetration airspeed is greater than max holding speed. You should:
a. start serving the passengers dinner.
b. increase to turbulence penetration speed and notify ATC immediately.
c. coordinate departure from the area with ATC.
d. advise ATC if you leave the turbulence and slow down to holding speed.
e. all the above.
f. b, c, and d only.

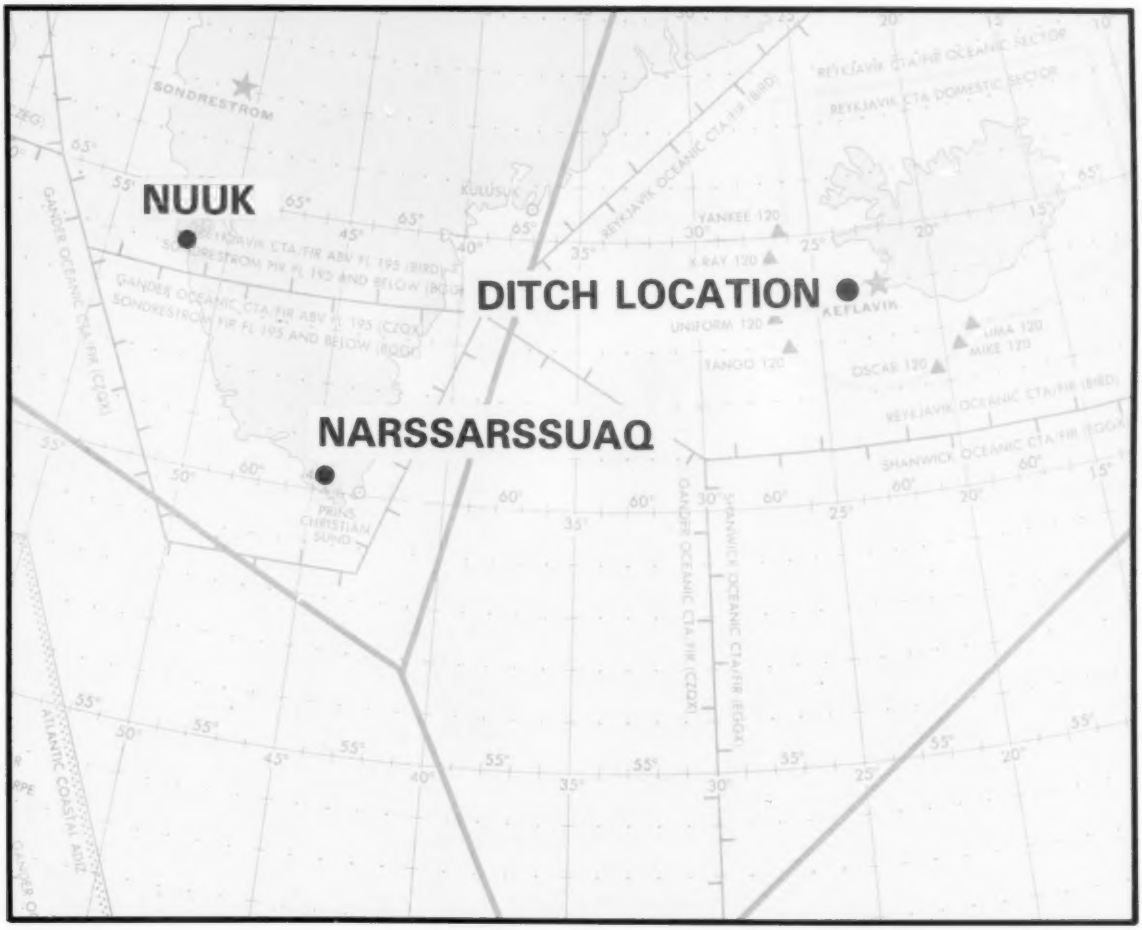
11. No quiz on holding is complete without this question. What's the maximum length of the initial outbound leg (no wind) of a holding pattern at 15,000 feet?
a. 1 minute.
b. long enough to finish a cup of coffee.
c. 45 to 75 seconds
d. 1½ minutes.

The Answers

1. (c) The holding course is defined by the depicted inbound course to the holding fix.
2. (b) A standard holding pattern is one with right hand turns.
3. (b) Leg lengths are 1 minute each and each standard rate turn (3°/second) takes 1 minute.
4. (b) You should start reducing speed 3 minutes or less from the holding fix to cross the fix at or below specified maximum holding airspeed. ATC can approve an earlier reduction, but you have to request it.
5. (c) Normal maximum holding airspeed for turboprop aircraft is 175 KIAS.
6. (d) When holding at a VOR station, pilots should begin turning to the outbound leg on the first complete reversal of the TO/FROM indicator. (Positive FROM indication.)
7. (d) The teardrop entry is limited to 1½ minutes wings level on the teardrop track.
8. (a or c) If you cannot determine the abeam position, start timing when wings level outbound.
9. (a) Proper entry turns are based on the aircraft's heading upon arrival at the holding fix. The 160° heading puts you in a position where you should turn outbound in the shorter direction (left turn in this case) to parallel the holding course.
10. (f) Because flight conditions might require a higher airspeed, there are provisions for airspace protection based on turbulent air conditions. Advise ATC because of the impact non-standard speeds can have on traffic separation.
11. (d) The initial outbound leg should be flown for 1½ minutes at 15,000 feet. You may adjust subsequent outbound legs to not exceed the maximum inbound time.

In a Hurry to Die

What made him in a hurry to die?



Every mission has inherent elements causing crewmembers to think they need to hurry and take shortcuts. Exercise or contingency requirements, weather, maintenance problems, or loading problems can compress the time we think is available to do our job. Coping with these external factors, most of which we can do little about, is part of the job most people understand and handle well. It's the self-imposed factors, however, that aren't handled very well. Personal commitments and problems, usually unrelated to aircraft operation, have caused otherwise prudent pilots to be in a hurry—to die.

Flight History

Apparent preoccupation with personal concerns, evidently distracting the pilot from basic

preflight actions and procedures, played a major part in an accident on 29 January 1986. At 1146 Greenwich Mean Time (GMT) N4906K, a Cessna P210N, departed Goose Bay, Labrador, Canada, on a transoceanic ferry flight to the airport at Narssarssuaq, Greenland. The pilot/purchaser of N4906K owned an air service in France. He held an FAA commercial pilot certificate with airplane single and multi-engine land and instrument ratings. He had successfully completed a biennial flight review on 27 October 1985. He also held a French private pilot license, valid until 31 January 1986.

The Cessna P210N was purchased from an Iowa corporation a few days before the accident. The pressurized airplane was equipped with a turbocharged fuel-injected engine and standard fuel tanks with 90 gallons of fuel (89 usable). According to the seller, an annual inspection had been completed by a mechanic with an inspection authorization in preparation for the FAA to issue an export Certificate of Airworthiness (C of A). The inspection had not been signed off because, according to the seller, the pilot was "in a big hurry to leave" and unwilling to await arrival of the inspector from the FAA's Des Moines, Iowa, office to approve the certificate and issue an export ferry permit. A Kentucky aviation maintenance facility reported it inspected N4906K on 25 January 1985, prior to the sale to the Iowa corporation. The airplane was properly licensed as a U.S. registered aircraft at the time of the accident. However, without an export C of A, the flight was illegal as a ferry flight to export the airplane from the United States to France.

N4906K left Iowa and arrived at Goose Bay 24 January 1986. The airplane was sent to Moncton, New Brunswick, Canada, for inspection. Transport Canada authorities in Moncton refused authorization for the trans-Atlantic flight because the airplane lacked required emergency equipment. The equipment wasn't available in Moncton, so the airplane was flown to Montreal, Quebec, Canada, to purchase equipment. On 27 January 1986, Transport Canada grounded the airplane in Montreal because the certificate of registration wasn't available. On 28 January 1986, confirmation of registration arrived and the transoceanic flight from Goose Bay to Narssarssuaq was authorized for VFR flight only, at or below 5,500 feet msl. N4906K wasn't equipped with a high frequency (HF) radio as required for IFR at 6,000 ft MSL and higher. Investigators couldn't determine if a rental HF radio was available.

Before departing Goose Bay, the pilot obtained a weather briefing from the Goose weather office. He was supplied with forecasts for his destination and an alternate at Nuuk, Greenland, the wind/temperature forecast, and the significant weather chart for the North Atlantic. The forecast for Narssarssuaq at the airplane's ETA was:

NARSSARSSUAQ

CLOUDS
1,000 SC
3,500 OV

VISIBILITY
10+ KM

WINDS
220/15-25

TEMPORARY
800 INDEF
SKY OBSCURED

VISIBILITY
1,500M

NUUK

CLOUDS
600 OV
FREEZING RAIN

VISIBILITY
5KM

WINDS
VARIABLE/10

TEMPORARY
CLOUDS
400 OV

VISIBILITY
800M
RAIN & SNOW
WIND 160/20

ENROUTE 5,000ft

WINDS
230/46 GOOSE BAY
150/54 NARSSARSSUAQ

SIGNIFICANT WEATHER—Cloud layers 2,000-20,000 ft from Goose Bay to destination and light to moderate icing from 5,000 to 12,000 ft at Goose Bay and between 10,000 to 20,000 ft at destination.

According to the weather briefer at Goose Bay, the pilot saw a copy of the significant weather chart prepared for another flight, but did not ask for a copy. The weather briefer stated the pilot was "anxious to go."

The pilot filed an international VFR flight plan with an estimated time en route of 5 hours and a fuel endurance time of 7 hours.

About 1346, 2 hours after departure, the pilot called the flight information center at Sondestrom, Greenland, on 121.3 MHz, and estimated the airplane was 60 miles west of the Prince Christian (OZN) beacon, located on the southern Greenland coast. (According to center personnel, an aircraft would have to be at 10,000 ft or higher from the location reported by N4906K for two-way communications on 121.3 MHz.) He was advised the weather at Narssarssuaq (special observation at 1313) was:

CLOUDS
1,200 SC

VISIBILITY
1,500M HORIZ
1,800 VERT
RAIN & SNOW

WINDS
070-130/25
MAX 36/MIN 16

The pilot was subsequently advised the 1350 surface observation at Narssarssuaq noted:

CLOUDS
1,200 SC
2,000 BK

VISIBILITY
5,000M
RAIN, SNOW &
ICE PELLETS

TEMPERATURE
1°C
DP 0°C

WINDS
100/27
MAX 28/MIN 17

Runway headings at Narssarssuaq are 080 and 260 degrees. The maximum demonstrated crosswind velocity of the airplane was 21 knots. (Maximum demonstrated crosswind capability does not constitute an airplane limitation.)

At 1358, the pilot was advised of Sondestrom SIGMET No. 1, issued at 1313, which was in effect for moderate to severe icing forecast in the area south of 66 degrees north latitude below FL 130, moving north. At that time, N4906K was about 58 degrees north latitude, 49 degrees west longitude, traveling northeast. The SIGMET was valid from 1330 to 1800 on 29 January, and was based on a pilot report which originated in the vicinity of Nuuk (64 degrees north latitude, 51 degrees west longitude). The pilot was also advised the 1350 surface observation for Nuuk was:

CLOUDS
600 BK
1,200 OV

VISIBILITY
1,500M
FREEZING
RAIN & SNOW

TEMPERATURE
0°C
DP 0°C

WINDS
240/18
MAX 30/MIN 8

Visibilities at both the 1313 (1,500 meters) and the 1350 (5,000 meters) observations were below those prescribed for either a VFR approach (8,000 meters) or an IFR approach (6,000 meters) at Narssarssuaq.

Visibility at the 1350 observation at Nuuk was 1,500 meters, greater than required for the two available localizer LLZ/DME approaches. The broken ceiling at 600 ft was below the MDA for the LLZ/DME approach.

At 1433, the pilot advised Sondestrom he intended to divert to Reykjavik, Iceland, estimating the OZN beacon at 1447 and Reykjavik at 1717. He estimated his fuel would be exhausted about 1846. At 1455, he advised Sondestrom the airplane was abeam the OZN beacon.

What will it take for you?

About 1658, the pilot radioed Iceland through a British Caledonian flight he estimated the airplane was 150 miles west of Keflavik, Iceland, and his ETA for Reykjavik should be revised to 1828.

About 1712, N4906K was identified on radar 188 miles west of the Keflavik VOR on the 272 degree radial. About 1716, the pilot reported 1 hour of fuel remaining. About 1721, the pilot initiated a climb from 5,500 to 15,000 ft after receiving a forecast for winds from 360 degrees at 10 to 15 knots at the higher altitude. Winds at 5,500 were 360 degrees at 25 to 30 knots according to a transmission from ATC.

About 1751, the airplane began to descend from 15,000 feet. About 1811, the airplane ran out of fuel, 6.4 hours after departure. During the airplane's descent, the pilot of a USAF C-130, launched from Iceland for search and rescue purposes, gave ditching instructions to N4906K's pilot and dropped flares to light up the sea. Weather in the ditching area was overcast at 900 ft, visibility 25 miles, wind from 033 degrees at 28 to 35 knots with ocean swells between 5 and 7 meters. The airplane appeared to ditch successfully; however, a USAF rescue helicopter arriving 3 minutes after ditching could find no sign of the two occupants. The plane disappeared about 8 minutes after ditching. Both pilot and passenger (pilot-rated) were presumed dead.

Analysis

How could a well qualified pilot put himself in such a situation? Obviously, the pilot was forced to ditch because of fuel exhaustion, however, this wasn't the cause of the accident, but the result of the pilot's lack of proper planning and apparent hurry to be on his way, for whatever reason. The NTSB calculated several range scenarios for the P210N in an attempt to determine the options available to the pilot. They determined that if the airplane had flown outbound at near maximum efficiency, an immediate decision to return to Labrador at 1346 probably would have resulted in the airplane reaching land and possibly Goose Bay. In any event, the airplane should have been able to reach Nuuk while in a normal cruise condition, even after reporting abeam OZN at 1455 or, given prevailing winds at 10,000 ft, could have reached Iceland if the entire flight had been flown at that altitude. However, the margin for error would have been extremely small.

When the pilot reported the airplane's position as 60 miles southwest of OZN at 1346, it probably was greater than 170 miles southwest, and possibly as far as 220 miles. Additionally, when the pilot reported the airplane's position as 150 miles west of Keflavik at 1658, he was probably about 220 miles west.

Probable Cause

The NTSB determined the probable cause of this accident to be threefold: flight into known adverse weather, inadequate fuel supply, and fuel exhaustion. All three were attributed to poor decisions of the pilot in command. The board also identified several other factors relating to this accident, the most notable being inadequate preflight/preparation by the pilot in command.

Application to MAC

Obviously, this pilot was "anxious to go" before he left Iowa. This was evidenced by his unwillingness to wait for proper certification, obtain proper emergency equipment, or thoroughly examine weather conditions, as well as required fuel. As MAC crewmembers, we receive a lot of support in the form of up-to-the-minute weather information, computer flightplans, first-class communication and survival equipment, and explicit guidance on the conduct of our missions this pilot didn't have. But, while this support makes it easier for us to do our job, it may make it harder for us to remember to put our personal concerns aside and concentrate on mission requirements when it's time to fly. It's not easy, and at times may seem a bit crass, especially when those concerns deal with our families. In this case, did a personal problem or committment override the pilot's sense of caution? Was it the fact his French pilot license was expiring in two days? Was that all it took to make him in a hurry to die? What will it take for you? ✈

Adapted from: *NTSB/AAR-87/01/Sum*

DARK SPECTACLES

It's Your Choice

A pilot wearing "photogray" sunglasses flew his private plane toward the setting sun above a cloud layer. Approaching his destination, he started a descent into an undercast and found the light intensity much lower. He had considerable difficulty seeing the aircraft instruments as the small plane descended through the murk, but he couldn't take off his glasses because his radio earpiece was attached to them. Eventually he spotted the runway and made a safe, but well-below standard landing. After removing his still-tinted photochromic lenses, he discovered the scene wasn't nearly as dark as he had thought.

Air Force pilots who require corrective lenses for flying aren't issued glasses that tint automatically. But nothing prevents said flyers from purchasing their own anti-glare spectacles, which in turn, like other personal items, find their way into the cockpit. These lenses, used incorrectly, can present a significant hazard.

The automatic change of tint in photochromic lenses is caused by microcrystals of silver halide impregnated in the glass. Ultraviolet rays in sunlight darken the crystals but, unlike photochromic film, the process is reversible. Thus, when light level is reduced, lenses become colorless again as the silver halide fades, or so the theory goes.

Automatic tinting has advantages that make photochromic lenses popular. Since tint varies with ambient light, a person who wears prescription lenses can often save the cost of an additional pair of glasses. Unfortunately, these antiglare lenses also have serious drawbacks for driving and flying.

To protect your eyes from glare, a tinted lens should transmit no more than 25 percent of visible light. A number of photochromic lenses can't even

The following chart compares several popular commercially obtainable sunglasses. *It is not* an endorsement or advertisement. Optical quality standards, selling price, your outdoor activities, as well as impact resistance should guide your sunglass selection.

SUNGLASS	TYPE LENS	TRANSMISSION	UV (%)	IR (%)
FG-58 (American Optical *et al*)	Constant Density Neutral Gray, N-15	15	99.8	85
RAY BAN Outdoorsman/Aviator (Bausch & Lomb)	Constant Density Neutral Gray, G-15	15	99	85
	Constant Density Green	26	99	95
	Constant Density Brown	15	99	95
	Reflecting + Neutral Gray	4 (Top) 23 (Ctr)	99	90
Vuarnet Skilynx Acier (Vuarnet-France)	Reflecting + Brown	7.7 (Top) 12.2 Ctr 6.5 Btm	100 84	90-99 70
Fishing Glasses (Eddie Bauer)	Polarizing	25	84	70

approach this standard. Additionally, most transport aircraft cockpits are well-shaded and, in combination with the windscreen's ultraviolet filtration effect, may not allow enough light through to activate the silver halide microcrystals, but allow enough to affect your eyes.

Photochromic lenses change tint automatically, but not instantaneously. Usually they darken much faster than they fade, a real problem when entering clouds from bright sunny "VFR on top." Under test conditions, some lenses removed from sunlight were only 50 percent clear after 20 minutes, and even after hours in total darkness, some never become more than 80 percent clear.

Sunlight can do considerable damage to your eyes. Three damage mechanisms illustrate the most common problem areas. Glare represents the sum of visible light intruding on your optic path. Damage resulting from glare ranges from mild discomfort to disabling loss of visual acuity. In any case, glare usually affect everyone's vision, negatively. The extent depends on intensity of light exposure and individual sensitivity. Another damage mechanism is utraviolet (UV) radiation caused by the same rays that activate silver halide microcrystals. These rays also cause high-altitude snow blindness and are linked with cataract development. Finally, infrared (IR) radiation adversely impacts your eyes. These are the sun's invisible rays, and can burn your retina to the point of permanent blindness.

Cumulatively, glare, UV radiation, and IR radiation cause fatigue, discomfort, squinting, tearing of the eyes, distraction, night vision loss, and reduced adaptation to darkness. With regard to dark adaptation, if you spend a whole day in bright sunlight, you probably won't regain your night vision until well into the next day. Regaining normal night vision after several consecutive days in bright sunlight may take from several days to two weeks of moderate/non-exposure.

Your eyes readily adapt to a wide range of light intensities, but below a certain level (approximately that of moderate indoor illumination), visual acuity falls off steeply with reduced light. Additionally, any transparency placed between your eyes and what you're looking at blocks a certain amount of light. When several layers of glass or plastic, such as eyeglasses and windscreen, are placed between pilot and aircraft exterior, visual performance can be significantly reduced with a sudden decrease in ambient light. This occurs routinely as when entering clouds or with approaching dusk. If you wear photochromic lenses in sunlight, you'll find your vision impaired when you enter clouds; the lenses just can't change that quickly. At dusk/night, pilots who wear antiglare lenses erroneously think their lenses reverted back to perfectly clear and are, unknowingly, at a disadvantage. Since transition from bright sunshine to gray murk can be instantaneous in flight, a *readily available* pair of clear corrective lenses is a necessity. For aviators, the best thing to do with photochromic lenses is treat them as ordinary sunglasses in flight. Speaking of regular sunglasses, there are several types with varying values to flyers. They are constant gradient lens, polarizing, reflecting, and any combination thereof. Some would argue photochromic should be included, but we've already discussed them.

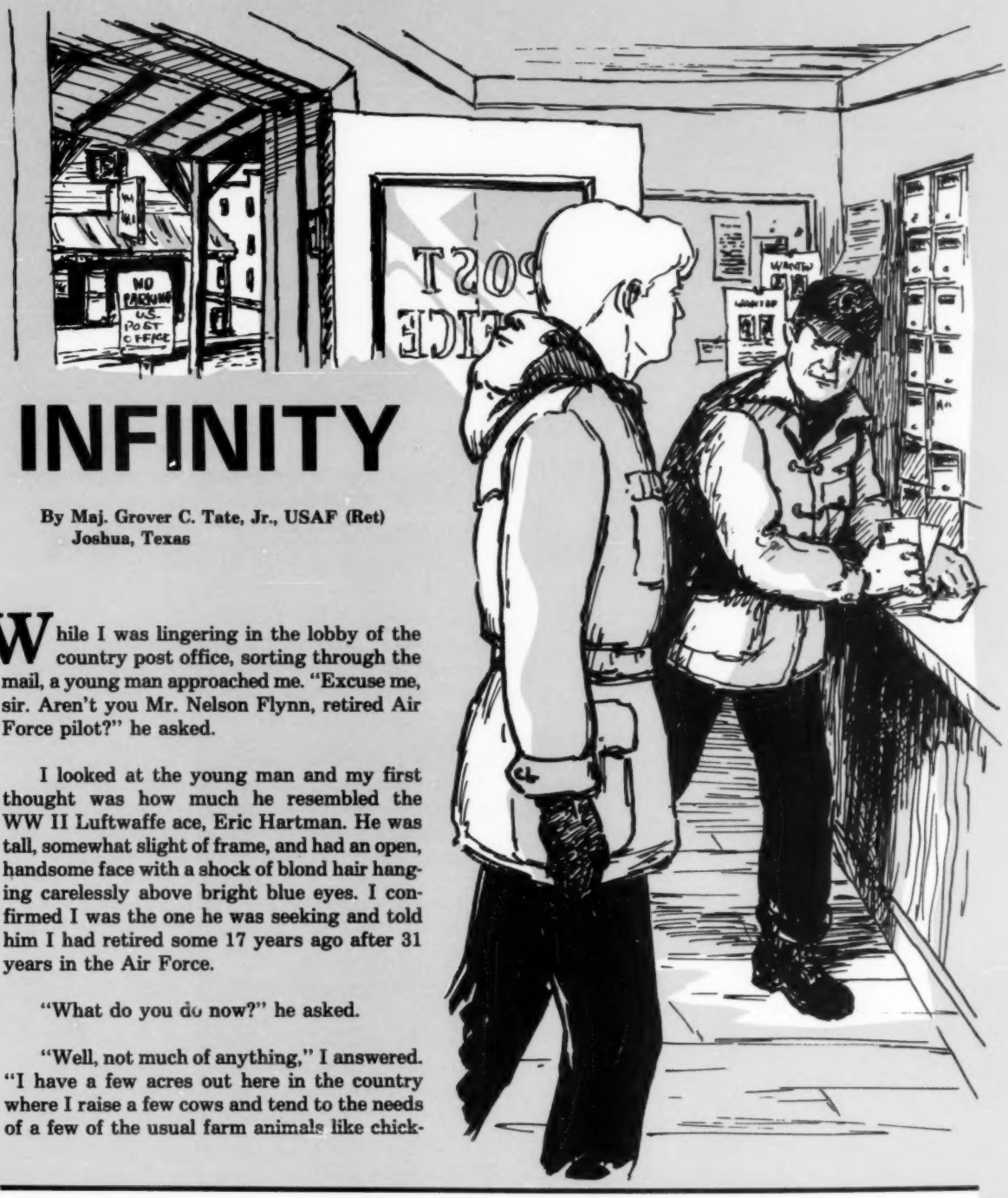
Constant gradient, or tinted lenses, come in various colors which doesn't affect their ability to allow a fixed amount of light to pass through, or the amount of UV rays absorbed or blocked. Color does become important when discussing IR radiation, however. Lens color also affects color perception (rose-colored glasses?).

Polarizing lenses block some light rays reflected from surfaces like water, snow, and sand. How effective they are depends on light-to-lens angle of incidence, which also means it will change depending on how you position your head while wearing them. It is this last bit of information which makes them particularly hazardous in cockpits. If you happen to align polarizing lenses 90 degrees to the polarization of a cockpit windscreen, you'll have a blind spot.

Reflecting lenses are tinted lenses with a thin metallic coating applied to further reduce light transmission. These lenses may be completely coated or have only the top/bottom portions coated—their effectiveness is a matter of transmission percentage.

DOD aviators are prescribed a lens known as FG-58 (flight goggle 58) which American Optical introduced in 1958. They have a neutral gray lens color, and are a very effective lens, considering UV, IR, and 'visible light" transmission factors. The point of all this is, there are effective lenses on the market besides those your flight surgeon prescribes, and one needs to consider which sunglasses to choose, in or out of the cockpit, to safeguard one's vision. Certainly the world-renowned "Cool" factor is a strong consideration, albeit quite subjective and geographical. But after you've selected the type lens which most effectively strokes your ego, use the chart we've provided to pick the best of the "cool," and stick to the FG-58 in the aircraft. ✯

ADAPTED FROM "Better Get Rid of the Cheap Sunglasses, Dilbert," by Lt. David M. Kennedy, *Approach*, September 1984, and "Shades of Gray," *TMF*, March 1980.



INFINITY

By Maj. Grover C. Tate, Jr., USAF (Ret)
Joshua, Texas

While I was lingering in the lobby of the country post office, sorting through the mail, a young man approached me. "Excuse me, sir. Aren't you Mr. Nelson Flynn, retired Air Force pilot?" he asked.

I looked at the young man and my first thought was how much he resembled the WW II Luftwaffe ace, Eric Hartman. He was tall, somewhat slight of frame, and had an open, handsome face with a shock of blond hair hanging carelessly above bright blue eyes. I confirmed I was the one he was seeking and told him I had retired some 17 years ago after 31 years in the Air Force.

"What do you do now?" he asked.

"Well, not much of anything," I answered. "I have a few acres out here in the country where I raise a few cows and tend to the needs of a few of the usual farm animals like chick-

SPECIAL CATEGORY
1987 MAC FLIGHT SAFETY WRITING CONTEST

You probably won't make as much money as . . .

ens, horses, cats, dogs, and a couple of unruly goats. I read a lot and try to stay in step with the way aviation is going. Seems like I'm always attending an Air Force reunion of some sort and that takes a bit of time. Every now and then I run an old flying movie like 'A Guy Named Joe' for a little stroll in the past and somehow time just seems to fly by. What's your interest in me anyway?" I asked.

"My name is Brian Owen, sir. I'm a junior in college and in ROTC. I learned to fly while a member of the Civil Air Patrol and plan on going into Air Force flight training when I graduate. But I'm now wondering whether or not I should make such a commitment with the Air Force. I'm not sure I want to promise that much of my life to something I don't know too much about. I'm in a sort of Catch 22 situation, knowing I want to go but a bit concerned about what I'm getting into other than the flying part. I thought you might have a few minutes to talk with me about a career in the Air Force, and give me some advice that might help me make a solid decision," he continued.

I was immediately flattered because there's nothing more an old retiree likes to talk about than his military career or past glories, real or imagined. Hundreds of thoughts tumbled through my mind about what I would tell this eager young man. Even a few negative thoughts about giving lousy advice intruded but I decided to give him the straight stuff, at least what I felt about it. I assured him I would tell him only of my experiences and opinions and he would have to separate the subjective from the objective. We wandered to a local cafe for an old-fashioned "koffee-klatch."

"Well, Brian, I'll start by qualifying my opinions with the caveat that I have been retired for a long time and that lots of things in the Air Force have changed since then. I feel many of the things in the Air Force that are important to me have stayed the same and will never change. One of the things that hasn't changed is that the Air Force will first blind you and then open your eyes to a greater and more understanding vision. You'll become blind to color, race, creed, physical characteristics and class ring of your fellow airmen and learn to see them as sincere friends and comrades who view you in that same light. You'll experience a warmth of camaraderie that will surround you with friendships that will last a lifetime.

"You do your job, fulfill your obligations, behave as an officer and gentleman and you will have a career that will provide you with success and fulfillment. Oh, you probably won't make as much money as some computer programmer for a big company or as a real estate agent, but will have the excitement of a career you wouldn't trade for the other guy's, even if they threw in a new BMW and their recipe for quiche. You'll develop such pride in what you do you'll always walk a little taller and even feel a bit sorry for earth-bound money guys," I rambled on.

"I sort of understand all of that," the youngster interrupted. "But what about flying? Does that ever get old and boring and become

just a routine job? Do you ever get scared and worry that you'll make some sort of mistake and get hurt or killed or hurt someone else and things like that? How about all those currency checks and suppose you get assigned to some dinky little old aircraft you don't like?" he continued.

"Yes, yes to all the above. You might get some flying assignments you won't like. Maybe you want to be a fighter pilot and instead they put you in cargo or bomber aircraft and your dreams of glamour fade a bit so you get discouraged or a little disillusioned. You have to bite the bullet and realize that whether you are pilot, navigator, engineer, loadmaster, or whatever, you're a damned important part of the aircraft team. Fighters, bombers, cargo or utility aircraft and helicopters—are all a part of the entire program and an important part. If you are a fighter jock you might criticize and josh a bit with the transport pilot but it will be with underlying respect and within the family—you know—when *you* can harrass your brother but someone outside of the family had better not try it.

"Sure, you'll get scared sometimes. Like old Pappy Boyington said, "Sometimes hours and hours of boring flying punctuated with seconds of pure terror." You learn your job and you can cope with the tough times. You'll be a survivor because you'll get to the point you don't even panic and can think unbelievably clear during emergencies," I said.

Then I thought of some of the injuries I had suffered and of the aircraft I had damaged during my career. I was secure in my own knowledge that most of those accidents and incidents had been avoidable, and in most part were due to my own errors in judgment and lack of proper procedures in times of crisis. I thought it was in my and his best interests not to mention my long-ago mistakes.

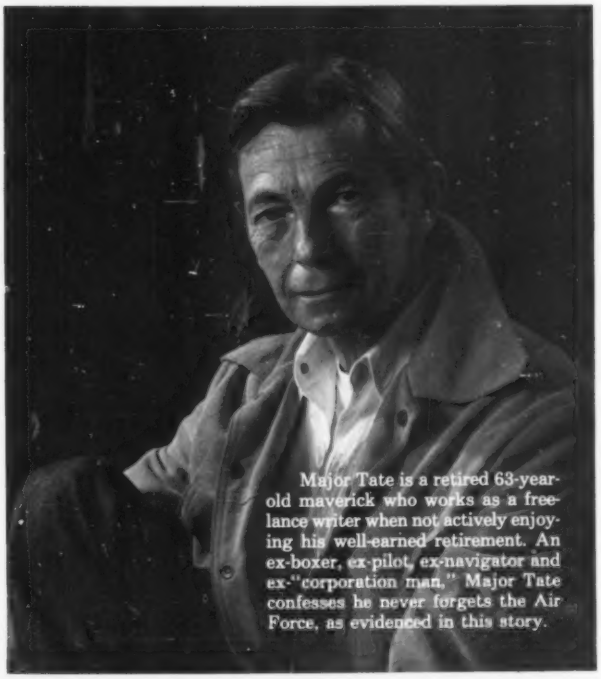
"You learn to fly right. You learn your aircraft right down to the last rivet and know exactly how everything operates. Never be embarrassed to ask questions about something you don't understand. Read every manual available about your aircraft and about procedures. Whenever you find unsafe practices or equipment, write a hazard report. Preflight carefully, always. Be a nit-picker if necessary. Unless critical circumstances, such as those that might arise in combat exist, never compromise the condition of your aircraft, your own physical condition, or that of the weather. Don't compromise anything just to fill a square on someone's chart. Know your emergency procedures as well as the normal ones. When you're flying along with nothing in particular to do, just imagine an emergency of some sort and mentally review exactly what you would do if such a thing really happened," I told him.

The young man virtually hung on my every word and my confidence in his ability to make a good Air Force officer increased.

"You really enjoyed the Air Force and are quite proud of your career?" he asked.

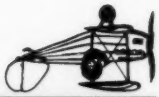
My eyes got the dampness born of pleasant memories and I told him he would some day feel the same way. He thanked me enthusiastically and said he would be proud to have me as a guest at his graduation from pilot training.

It was then I realized our responsibility for the integrity and safety of our Air Force never ends. We may become old and inactive, but the pride and responsibility goes on forever. ✈

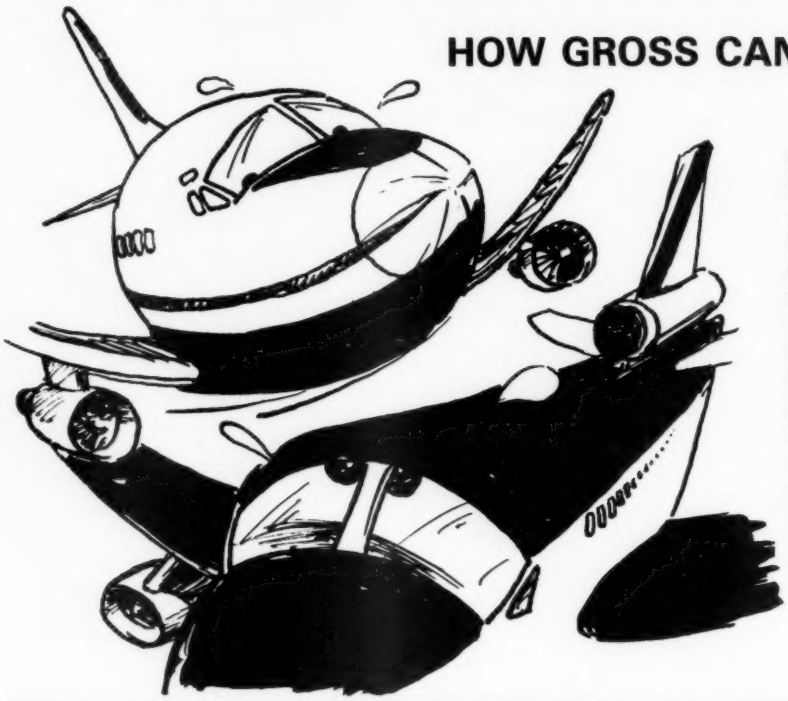


Major Tate is a retired 63-year-old maverick who works as a free-lance writer when not actively enjoying his well-earned retirement. An ex-boxer, ex-pilot, ex-navigator and ex-"corporation man," Major Tate confesses he never forgets the Air Force, as evidenced in this story.

QUICKSTOPPERS



HOW GROSS CAN YOU GET?



Well, two civil airline crews found out this summer when they nearly collided over the North Atlantic as the result of a navigation error. Misprogramming one airplane's INS by one degree made it stray 60 miles off course, causing it to cross the other's track and miss by an estimated 100 feet. Can't happen to you? That's what these guys probably thought, too. MAC has procedures to prevent this type of occurrence, but they won't do anyone any good unless we follow them *all the time.* (For more on Gross Navigation Errors, see the May 1986 *TMF.*)

LUCKY SPARE!

The UH-1N Twin Huey, lead in a 3-ship formation, flying at 50 ft AGL through mountainous terrain, had just crossed a ridge and was flying up a canyon when the crew heard a "pop" and a grinding noise. Correcting a left yaw, the AC at the controls noticed the caution panel lit up like a Christmas tree. Unable to turn around and follow the terrain downhill because of his wingmen, the pilot elected to land straight ahead on a dirt road. While setting up approach, the copilot confirmed failure of number 2 engine and accomplished boldface procedures. With only one engine providing 45 percent of the 72 percent power needed to hover, the crew elected to effect a slide-on landing. With a judicious use of limited power from the number 1 engine, the pilot executed an uneventful 15-foot slide. After shutting down the engine, they found a quarter-sized hole in the power turbine exhaust section caused by a turbine blade thrown when the section disintegrated. The crew also found a large dent in a tail rotor blade, possibly caused by a turbine blade ejecting through the exhaust.

It's a good thing this "lucky" crew had a second engine to rely on during this low-level tactical flight.

After Deadlines

A THERMOPLASTIC C-130 belly skin panel passed a scheduled test at Lockheed-Georgia company recently, clearing the way for flight tests of a similar thermoplastic panel. The test panel withstood pressures that were identical to the ultimate load for which the fuselage was designed. For the Air Force, the payoff with thermoplastic composite materials is improved field support. Thermoplastic composites could be a particularly attractive material for structural parts that are subject to a great deal of impact damage and corrosion, such as C-130 belly skins. Rocks and other debris kicked up by the nose wheels when landing at austere sites damage belly skin panels. The problem is compounded when aircraft also operate in moist climates. Development of the thermoplastic technology is designed to quickly transition to field applications. Courtesy Lockheed-Georgia Information Office.

SEVERAL MAC active duty, Reserve and Guard units pitched in recently to help fight fires raging throughout California. Reserve and Guard units flew 8 C-130s equipped with modular airborne firefighting systems. These systems, owned by the Forest Service, represent the Air Force's total airborne firefighting force. Crews from 146 TAW (ANG), 153 TAG (ANG), 145 TAG (ANG), 943 TAG (ANG), 62 MAW, 63 MAW, 438 MAW, 349 MAW (AFRES), and 314 TAW logged more than 187 missions, dropped approximately 549,000 gallons of retardent, and were credited with completely extinguishing two fires and with saving more than 1,000 homes.

AN MH-53H PAVE LOW helicopter from the 1 SOW, Hurlburt Field, Florida, was involved in a mishap on 25 Sep 1987, at Fort Bragg, North Carolina. The mishap resulted in one death and five injuries. The injured were transported by U.S. Army air ambulance to Womack Army Hospital at Fort Bragg. The mishap occured during a mobility training exercise with members of the 1st Battalion, 75th Rangers from Hunter Army Air Field, Savannah, Georgia.

HOW DO YOU RATE OUR NEW LOOK?

A facelift is welcomed after 32-years of life, or so we've been told. We at *TMF* are excited about our new look. The inclusion of four-color process, better paper (coated stock), and a new logo offers new vistas and challenges, hopefully rejuvenating our creative thoughts, and spurring us on to new and bold ideas. We've also taken this "eye-catching opportunity" to introduce a couple of new concepts—*a signature page,* introduced last month, and stories from the field, beginning this month. Our objective is to increase readership and cultivate safety awareness. To know if we're succeeding, we need to hear from you. Keep those postcards and letters coming, or if you're out of stamps, call!

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